TRANSMISSION SYSTEM PLANNING & POWER SYSTEMS STUDIES

PGE is a world-class provider of Transmission Planning and Power Systems Studies services. PGE has extensive utility-grade and high-voltage grid experience with planning, operating and maintaining bulk power systems. We offer a variety of transmission planning and system studies services to assist utilities in compliance with applicable NERC, Regional Reliability Organization (RRO), industry and client standards. Our engineers have extensive experience in generation interconnect processes.

TRANSMISSION PLANNING SERVICES
www.powergridengineering.com/transmission-system-planning-power-systems-services

SHORT & LONG TERM POWER SYSTEM STUDIES
- Contingency Analysis
- P-V Analysis
- Reliability Analysis
- Short Circuit Analysis
- Economic Analysis
- Transmission Service Request
- Thermal/Voltage Analysis
- Maintenance Outage Evaluations
- Transient Stability Analysis

INTERFACE EVALUATION
- Total Transfer Capability (TTC) Analysis

TECHNOLOGY EVALUATION & SYSTEM ANALYSIS
- PSS®/E
- Power World
- PSS®/MUST
- CAPE
- TARA
- PSS®/SINCAL

PSS is a registered trademark of Siemens

powergridengineering.com
# Transmission Planning Portfolio Highlights

**Transient Stability Review**  
**Brookfield Renewable, Alabama**  
Analyzed transient stability of numerous nuclear, coal, combined cycle, combustion turbine and hydro units to demonstrate compliance with NERC TPL, MOD, FAC and PRC standards. Analysis provided operational guidance for equipment and Relay outages. Mitigation strategies included limiting maximum MW output of units and temporary Relay settings. Technical guidance provided for potential closing angle issues.

**Transmission Expansion Planning – Gas**  
**Georgia**  
Project consisted of performing short and long-term transmission planning studies and economic analysis for cost effective transmission capital additions, while ensuring compliance with applicable NERC Reliability Standards. These studies included periodically coordinating approval of Transmission Capital additions among joint transmission owners within the State of Georgia.

**Fault Induced Delayed Voltage Recovery**  
**Georgia Integrated Transmission System**  
Review of the North Georgia metropolitan area for susceptibility to Fault-Induced Delayed Voltage Recovery (FIDVR) for NERC extreme events. Analysis proposed different mitigation strategies including Relay settings changes, addition of redundant Relaying, installation of Independent-Pole Operated (IPO) breakers, and Under Voltage Load Shedding (UVLS) schemes to comply with applicable NERC TPL and PRC standards. This study also provided short term mitigation strategies including temporary Relay settings requirements and Generation dispatch for system load levels and system configurations.

**Out-of-Step Protection - Hydro Units**  
**Georgia**  
Study analyzed transient stability of several hydro units and provided settings for out-of-step protection. The study provided impedance trajectories expected during an unstable swing as well as a stable swing. Relay settings were provided for distance Relay trips for unstable swings and non-tripping during stable swings.

**Generator Interconnection Studies**  
**Florida, Alabama, Georgia & Mississippi**  
Studies analyzed steady state (thermal and voltage), stability and short circuit impacts of numerous proposed generating units applying for interconnection agreements through the Large Generator Interconnection Procedures (FERC ORDER 2003 LGIP). Network upgrades analyzed to applicable NERC, Regional Reliability and transmission provider planning standards.

**Total Transfer Capability Determination**  
**Georgia**  
Performed daily and monthly analysis of Total Transfer Capability (TTC) levels for several Available Transfer Capability (ATC) Paths. The analysis considered simultaneous interaction among several paths. In addition, certain paths were required to be coordinated among entities of adjacent regions.

**Generator Interconnection Representation**  
**Alabama**  
Represented and provided independent review of Feasibility, System Impact and Facilities Study results (thermal, voltage, short circuit, stability and required network upgrades) for generation developers’ Generator Interconnection Requests.

**Single Point of Failure**  
**Florida, Alabama, Georgia & Mississppi**  
Project consisted of performing analysis to assess the impact of protection system failures on bulk-power system reliability. The assessment included an evaluation of faults that were not cleared by local protection due to a single point of failure of the local protective relaying system.

**Third Party Verifier for NERC CIP-014-1**  
**Florida, Indiana, Kentucky, Ohio, North Carolina & South Carolina**  
Performed the functions of the Third Party Verifier of the Transmission Owner (“TO”) Risk Assessments as outlined under NERC CIP-014-1 Requirement R2 for six (6) TOs across the Southeast. The project included a review of the Risk Assessment Methodology that was developed by each TO to identify and develop a list of Transmission Stations and Transmission Substations that if rendered inoperable or damaged could cause instability, uncontrolled separation, or Cascading within an Interconnection. Verifications of each TO’s transmission models, study results and final list of stations were also performed, and recommendations to the final list of identified Transmission Stations or Substations were given as necessary.